Fragmentation of nickel...

S/601/60/000/011/008/014
D207/D304

610 hours under a load of 5 kg/mm^2 showed gradual fragmentation of grains. Fragmentation was more intense in the initial stages of the test when the rate of creep was higher. Fragment dimensions (0.1 - 0.6 mm) were of the same order as grain dimensions, but 2 - 3 orders were greater than block dimensions (10^{-5} cm). Apart from grain fragmentation, blocks were also broken up in some grains continuously throughout the creep test, while in other grains blocks increased in size due to the annealing effect at 450°C. Microhardness increased gradually up to 120 hours under load and then decreased, retaining after 610 hours a value higher than at the beginning of the test. This change of microhardness is due to more intense fragmentation and a consequent generation of type II deformations during the earlier stages of the test. In the later stages, fragmentation was less intense, creep proceeded mainly by slip along grain and fragment boundaries, some deformations were removed and some blocks grew in size; all this reduced microhardness. There are 3 figures, 3

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Fragmentation of nickel...

tables and 2 Soviet-bloc references.

SUBMITTED: September 15, 1959

S/601/60/000/011/008/014
D207/D304

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S/601/60/000/011/009/014
D207/D304

AUTHORS: Kozyrskiy, G. Ya., and Ryaboshapka, K. P.

TITLE: Estimation of the dislocation density from
                fragment and block boundaries during creep in
                nickel crystals

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut
                metalofyzyky. Sbornik nauchnykh rabot. no.
                11. 1960. Voprosy fiziki metallov i metallo-
                vedeniya, 101-105

TEXT: The authors present estimates of the density of dislo-
cations produced by creep in nickel. Nickel of 99.99% purity was
annealed at $1100^{o}C$ for 3 hours and loaded with 5 kg/mm^2 at $450^{o}C$
for 610 hours. The resultant creep produced fragmentation of
grains and break-up of the fragments into blocks. The disloca-
tion density ρ was taken to be proportional to an angle ϑ re-
presenting the difference between orientations of individual

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Estimation of the...

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D207/D304

blocks in a single fragment. The value of ϑ was found as the angular half-width of the X-ray diffractogram peaks with an allowance for beam spread and block dimensions. Three models were tried: (I) the same mean angle ϑ for all blocks; (II) a random distribution of ϑ's; (III) a Gaussian distribution of ϑ's. Model I gave the lowest dislocation density, model III the highest density, and model II yielded intermediate values. Calculations showed that initially the density ρ was between

2×10^6 cm^{-2} (model I) and 2×10^7 cm^{-2} (model III). After 610 hours of creep, the density ρ rose to a value of between

3×10^8 cm^{-2} (model I) and 2×10^9 cm^{-2} (model III). The latter value agreed well with the results of P. Gay, P. B. Hirsch and G. Kelly (Ref. 4: Acta Met., 1, 315, 1953) for cold-work nickel deformed by 6.6%. There are 1 figure, 1 table and 7 references: 5 Soviet-block and 2 non-Soviet-bloc. The reference to the English-language publication reads as follows: P. Gay, P. B. Hirsch, G. Kelly, Acta Met., 1, 315, 1953

Card 2/3

Estimation of the...

S/601/60/000/011/009/014
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SUBMITTED: September 15, 1959

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30409
S/058/61/000/009/026/050
A001/A101

24.7200

AUTHORS: Danilenko, V.M., Kozyrskiy, G.Ya.

TITLE: On the problem of intensity of reflections on a roentgenogram

PERIODICAL: Referativnyy zhurnal. Fizika, no. 9, 1961, 189, abstract 9E48 ("Sb. nauchn. rabot In-ta metallofiz. AN UkrSSR, 1960, no. 11, 134-149)

TEXT: The authors consider the dependence of reflection width along and across the arc of Debye rings on the beam divergence, grain size and its mosaic structure. It is shown that the longitudinal width of reflection is considerably greater than the transverse one; it exceeds the greatest of the quantities corresponding to the action of each of the three factors of broadening. The longitudinal width of reflection changes at rotation of the crystal around the axis perpendicular to the plane of this reflection and simultaneous motion of the film along the rotation axis; this reflection width depends on the mean magnitude of orientation difference of the blocks and the ratio of velocities of crystal rotation to film motion. Using the known experimental data on reflection width along the arc of Debye ring for three different conditions of film

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S/058/61/000/009/026/050
A001/A101

On the problem of intensity of reflections ...

motion, it is possible to determine mean values of orientation difference of the blocks in two directions in the crystal and the position of these stresses relative to the crystal axes.

L. B.

[Abstracter's note: Complete translation]

Card 2/2

DANILENKO, V.M.; KOZYRSKIY, G.Ya.

Method of determining the mosaic structure of deformed crystals.
Sbor. nauch. rab. Inst. metallofiz. AN URSR no.11:150-157 '60.
(MIRA 13:11)

(Crystals--Defects)   (Metallography)

KOZYRSKIY, G.Ya.; OKRAINETS, P.N.

    Effect of loading methods on nickel creep characteristics. Sbor.
    nauch.rab.Inst.metallofiz.AN URSR no.12:117-123 '61.   (MIRA 14:8)
                      (Creep of nickel)

S/058/62/000/009/030/069
A006/A101

AUTHORS: Kozyrskiy, G. Ya., Okrainets, P. N.

TITLE: Changes in the fine structure of nickel grains during creep

PERIODICAL: Referativnyy zhurnal, Fizika, no. 9, 1962, 51 - 52, abstract 9E361
             ("Sb. nauchn. rabot In-ta metallofiz. AN·UkrSSR, 1961, no. 13,
             118 - 132)

·TEXT: Measurements were made of the radial width of X-ray reflection
from individual grains of polycrystalline Ni (99.99%) which had been subjected
to creep tests. It was established that at 350 - 550°C and stresses as high as
5 - 7.5 kg/mm², the reflection width from all the grains investigated increased
during the non-steady creep stage. At the beginning of a steady creep stage,
changes in the width of reflection from individual grains become noticeably less
uniform. There is not only a difference in the absolute magnitude of the width
but also in some cases a decrease of the latter. As steady flow develops, the
width of reflection from the majority of grains decreases. The changes revealed
in the reflection width are connected with the fact that the joint effect of

Card 1/2

S/601/61/000/013/013/017
D207/D302

/8.1150

AUTHORS: Kozyrskiy, G. Ya. and Kononenko, V. A.

TITLE: A study of changes of the structure of a metal in the
             initial stages of deformation

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut metalofyzy-
             ky. Sbornik nauchnykh rabot, no. 13, 1961. Voprosy fi-
             ziki metallov i metallovedeniya, 133-138

TEXT: The authors studied the initial stages of creep in nickel
using an X-ray technique earlier described by them and P. N. Okra-
inenko, and by G. Ya. Kozyrskiy and V. M. Danilenko. This method
which consists of synchronous rocking (rotation) of a sample and
a cylindrical photographic film about the same axis, gives infor-
mation about individual grains in polycrystals. Samples were in
the form of cylindrical rods of 5 mm diameter and 50 mm long. They
were prepared from 99.99% pure nickel by adding 1% Mo. Before
tests the samples were annealed in evacuated quartz ampoules at
1100°C for 70 hours. After this treatment the mean grain dimensions χ

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A study of changes ...   S/601/61/000/013/013/017
                                      D207/D302

were about 0.4 mm. In X-ray measurements Cu radiation, with the
K_2 component filtered out, was employed. Creep tests were carried
out at 550°C under loads of 5 and 7.5 kg/mm^2 applied for up to
223 hours. These loads produced deformations from 2 to 4%. Grain
fragmentation occurred only during the first stage of creep, last-
ing several minutes. Mosaic angles (angles between orientations of
blocks or fragments in a grain) increased throughout the tests.
Increase of the applied load, from 5 to 7.5 kg/mm^2, increased the
number of blocks into which grains were broken up. The X-ray re-
sults were confirmed by examination of polished sections with a
metallurgical microscope. There are 5 figures and 3 Soviet-bloc re-
ferences.

SUBMITTED: September 15, 1960

Card 2/2

S/601/62/000/016/003/029
E111/E451

AUTHORS: Kozyrskiy, G.Ya., Okrainets, P.N.

TITLE: Recrystallization of nickel during creep

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut metalofyzyky.
              Sbornik nauchnykh rabot. no.16. Kiev, 1962. Voprosy
              fiziki metallov i metallovedeniya. 22-30

TEXT: Little published information is available on recrystall-
ization during creep, and no experimental study has been made on
the influence of recrystallization on the mechanism of creep and
of creep failure.   The authors consider that the effects are
undoubtedly linked.   They studied recrystallization during creep
at 350, 500, 550 and 900 °C of 99.99% purity nickel.   Specimens
from which the work-hardened surface layers had been removed were
vacuum annealed at 1100 °C and cooled at 30 °C/hour.   Recrystall-
ization was studied mainly by metallography.   From the results
the authors conclude that under creep-test conditions the
recrystallization of nickel was governed mainly by the same
factors which govern recrystallization when deformation and
annealing are carried out separately, i.e. degree of deformation,
Card 1/2

Recrystallization of nickel ...   S/601/62/000/016/003/029
                                         E111/E451

temperature and duration of annealing.   In creep the influence of
these factors can be markedly different, e.g. the speed as well as
the degree of deformation has an important effect.   This is
because at low speeds and high temperatures the lattice distortions
are slight, since relaxation and recovery hinder their accumulation,
and consequently the only effect is the development of polygoniz-
ation.   At high speeds the distortions can accumulate and
conditions become favorable for recrystallization, which occurs
both by growth of new grains at the expense of the old and by the
formation of nuclei and growth of new grains.   The investigation
did not provide enough evidence for assuming that any special
recrystallization mechanisms came into play under the creep-test
conditions.   Recrystallization under the test conditions required
the presence of plastically deformed grain regions.   There are
7 figures.

SUBMITTED: January 26, 1962

Card 2/2

DANILENKO, V.M.; KOZYRSKIY, G.Ya.

Methods of determining mosaic structure. Sbor. nauch. rab.
Inst. metallofiz. AN URSR no.14:46-54 '62.   (MIRA 15:6)
        (Crystal lattices) (X-ray crystallography)

/S 9L6-

S/601/62/000/014/004/012
I003/I203

AUTHORS.   Kozyrskiy G Ya., and Okrainets, P N

TITLE: Structural changes in nickel during creep under conditions of interrupted loading

SOURCE.   Akademiya nauk Ukrayins'koyi RSR. Instytut metalofyzyky. Sbornik nauchnykh rabot.
                no 14. Kiev, 1962. Voprosy fiziki metallov i metallovedeniya, 55-67

TEXT: X-ray, metallographic and mechanical investigations were carried out of the changes taking place
in nickel under given conditions The creep tests were carried out in vacuum which allowed the microstructural
changes taking place on the surface of the samples to be investigated after each consecutive test. The relation-
ships between the angles of the mosaic structure, the rotation of the grains, X-ray diffraction patterns, hard-
ness and the degree of deformation imparted during the creep tests are given. The conclusions to be drawn
from the data of this investigation are that the combined action of elevated temperature (500°C) and small
loads (up to 3 kg/mm²) leads to a further improvement of the crystalline lattice even after the sample has been
subjected to high temperature annealing at 1100°C for 3 hours, and that the nature of creep and of structural
changes caused by creep under interrupted loading are different from those taking place under continuous
loading. In order to define the concrete mechanism of the influence of the structure of grains on the processes
of creep, and on destruction caused by creep, further meticulous investigations are required. There are 9
figures and 3 tables.

/L

Card 1/1

40672

S/601/62/000/014/005/012
1003/1203

AUTHORS.   Kozyrskiy, G. Ya, and Okrainets, P. N.

TITLE: The deformation of grain boundary zones in nickel during creep

SOURCE·   Akademiya nauk Ukrayins'koyi RSR. Instytut metalofyzyky. Sbornik nauchnykh rabot no 14. Kiev, 1962. Voprosy fiziki metallov i metallovedeniya, 68-77

TEXT·   The data given in the works of the same authors in "Voprosy fiziki metallov i metallovedeniya" (Problems of Physics of Metals and Metallurgy) no. 13, and no. 12, 1960, indicated a high degree of non-uniformity in the deformation of individual grains in polycrystalline nickel samples under various conditions of creep tests In the present work the deformations occurring in individual grains of pure nickel (99.99%) are investigated. The creep tests were carried out in vacuum under various conditions of loading with loads of up to 5 kg/mm², and at a temperature of 500°C resulting in a recrystallization of grains. The investigation of the resulting microstructures of the grains showed the formation of lines mostly in the vicinity of grain boundaries. though sometimes also occurring within the grains These lines are either non-uniform deformat-tions occurring along the the slip planes when the stress applied is parallel to them, or cracks when the direc-tion of application of the stress differs considerably from that of the slip planes The fact that published data indicate the existence of similar structures in aluminum, in aluminum-magnesium alloys, and in nickel, in nickel-aluminum and in nickel-copper solid solutions is emphasized. There are 11 figures.

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S/601/62/000/014/006/012
I003/I203

AUTHORS   Kozyrskiy, G. Ya, and Petrunin, G. A.

TITLE: Deformation of grains located on the surface and within polycrystalline samples during creep tests

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut metalofyzyky. Sbornik nauchnykh rabot. no 14. Kiev, 1962. Voprosy fiziki metallov i metallovedeniya, 78-83

TEXT: The usual accepted method for judging the structural changes taking place in metals during creep tests by investigations carried out on the surface of the samples is erroneous, as the surface grains with one or more free faces are under different conditions than those lying beneath the surface, especially at elevated temperatures. In the present work the authors investigated by X-ray and by metallographic methods whether the deformation of the surface grains in the samples is the same as that in the grains lower down, when the total deformation in 99.99 % pure nickel samples is 5 to 7% as result of creep test. The structure of the grains lying 2 mm beneath the surface was investigated after cutting the sample and electrolytically removing the cold-worked surface. The conclusion is drawn that the mean deformation of grains on and beneath the surface is the same There are 2 tables and 1 figure

Card 1/1

S/601/62/000/016/027/029
E111/E451

AUTHORS: Drynov, A.D., Kozyrskiy, G.Ya., Okrainets, P.N.

TITLE: Vacuum installation for the creep testing of metals

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut metalfyzyky.
              Sbornik nauchnykh rabot. no.16. Kiev, 1962. Voprosy
              fiziki metallov i metallovedeniya. 194-197

TEXT: Vacuum creep-testing gives useful results which are more
amenable to analysis.   The installation is described and shown in
the figure where 1 is a massive metal plate, 4 is a cylindrical
hood 500 mm diameter by 700 mm tall, raised by the winch 5.
The working pressure in the hood is 10^{-5} mm Hg.   The top end of
the specimen is supported by the massive columns 2, while the
bottom is loaded by a lever with a 5:1 ratio,   The lever is
aligned either by a movable support adjusted by the worm gear 8
and the contact-relay 9, or manually.   Either constant or
smoothly-varying loading is possible,   The specimen holder 7
(enlarged view inset) is designed for frequent removal without
damage.   The indicator 13 shows elongation, its readings being
calibrated from marks on the specimen.   For convenience the
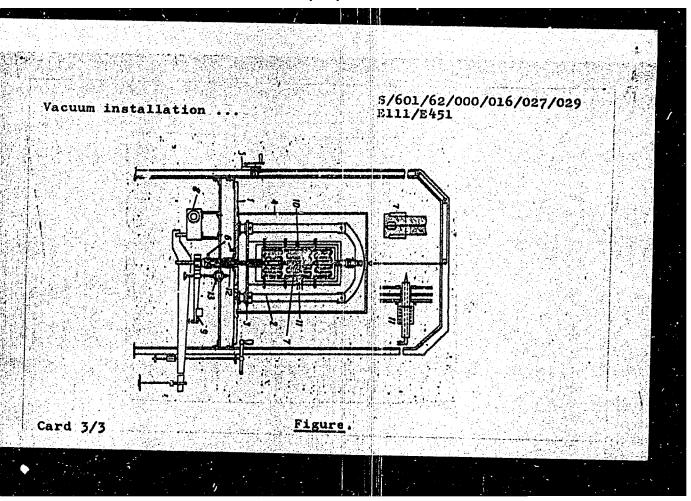Card 1/3

Vacuum installation ...

S/601/62/000/016/027/029
E111/E451

furnace is divided, one half being attached to the adjustable
support 3, the other removable. The heater is similarly divided
and each half is supplied with up to 12 V. Thermal insulation is
by radiation shields, giving very low thermal inertia and a
maximum working temperature of 1000°C. Specimen temperature is
measured with three thermocouples 11, the junctions being pressed
against the specimen by a tungsten spring (enlarged view inset).
A magnetic-amplifier temperature controller is used, which will be
described in a further communication; the pick-up of the
controller is situated at 10. There is 1 figure.

SUBMITTED: January 26, 1962

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Vacuum installation ...   S/601/62/000/016/027/029
                                           E111/E451

Card 3/3   Figure.

S/126/62/014/006/014/020
E193/E383

AUTHOR: Kozyrskiy, G.Ya.

TITLE: The high-temperature range of the beneficial effect
            of polygonized structure on creep

PERIODICAL: Fizika metallov i metallovedeniye, v. 14, no. 6,
            1962, 917 - 924

TEXT: One of the conclusions of work carried out by
Zschokke and Niehus (J. Iron Steel Inst., 1947, 156, 271) was that
preliminary work-hardening had no beneficial effect on the creep-
resistance of alloys·stressed at temperatures approaching that
at which recovery took place in a work-hardened material. Some
experimental results obtained earlier by the present author contra-
dicted this theory and indicated that a more detailed study of
the problem was required - hence the present investigation, con-
ducted on 99.99% pure nickel. The tensile creep tests were
carried out in vacuum on cylindrical test pieces (5 mm in diameter,
50 mm long) both ·in the annealed condition (3 h at 1 100 °C) and
after varying degrees of preliminary plastic deformation at the
test temperature, which ranged from 350 - 900 °C. Creep tests were
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The high-temperature range S/126/62/014/006/014/020
E193/E383

periodically interrupted in some cases and the test pieces
examined metallographically and by X-ray diffraction. Typical
results obtained for specimens tested at 550 $^\circ$C under a stress of
6 kg/mm^2 are reproduced in Fig. 1, where the time-to-rupture
(τ, hrs - first scale) and the rate of steady creep (v, %/h -
second scale) are plotted against the degree (ε_o, %) of prelimin-
ary deformation at the test temperature. Similar results were
obtained at other temperatures. Metallographic and X-ray diff-
raction analysis showed no evidence of recrystallization in the
specimens which, after being given the optimum degree of
preliminary deformation, were tested to fracture. Conclusions.
1) For each temperature there is an optimum degree of preliminary
deformation resulting in the formation of a specific polygonized
sub-structure, which gives rise to a maximum increase in the creep-
resistance of Ni at that temperature. The optimum values of
preliminary deformation at 550, 700 and 900 $^\circ$C have been found to
be 2.9, 2.8 and 1.5%, respectively. 2) The dislocation mechanism
of plastic deformation predominates in nickel tested at 350-900 $^\circ$C
under stresses ranging from 7.5 - 1.0 kg/mm^2, respectively, the
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The high-temperature range S/126/62/014/006/014/020
                                   E193/E383

diffusion mechanism accounting only for 10^{-5} - 10^{-4} of the total strain. This explains the beneficial effect of the polygonized structure on the high-temperature properties of Ni. 3) There is no definite temperature limit at which the preliminary deformation ceases to have a beneficial effect on the resistance of Ni to creep. The effect persists at relatively high temperatures (900 °C, which is 600 °C above the recrystallization temperature of Ni), the optimum degree of preliminary deformation decreasing with increasing temperature. This finding is in direct contradiction to the generally accepted view that the recrystallization temperature constitutes a threshold above which the fine structure of the metal cannot be utilized to improve its creep characteristics. There are 4 figures.

ASSOCIATION: Institut metallofiziki AN SSSR
                (Institute of Physics of Metals of the AS USSR)

SUBMITTED: February 28, 1962

Card 3/4

S/601/62/000/016/004/029
E193/E383

AUTHORS: Kozyrskiy, G.Ya. and Kononenko, V.A.

TITLE: The effect of chromium and boron on the creep of
             nickel

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut metalofyzyky
             Sbornik nauchnykh rabot. no. 16. Kiyev, 1962.
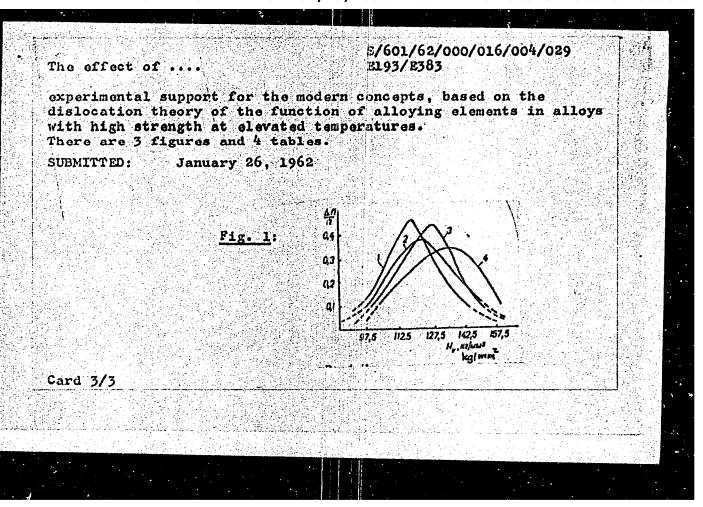   Voprosy fiziki metallov i metallovedeniya. 31 - 38

TEXT: Mechanical tests, metallographic examination and X-ray
diffraction measurements were used to study the effect of 1.5% Cr
and 0.01% B additions on the rate of primary and steady creep of
Ni. The creep tests were carried out at 550 °C under stresses of
5 - 15 kg/mm^2 on specimens annealed to obtain an average grain-
size of approximately 0.5 mm. The results of the first series of
experiments showed that both Cr and B additions brought about a
decrease in the rate of creep, but that the effect of Cr on the
primary and steady creep rate was, respectively, more and less
pronounced than that of B. It was also found that the rate of
creep of the Ni-Cr alloy was slower in air than in vacuum, this
effect being attributed to the formation of an oxide film acting
Card 1/3

The effect of ....

S/601/62/000/016/004/029
E193/E383

as a barrier to the movement of dislocations. Further measurements showed that Cr considerably slowed down the increase in the degree of misalignment of the mosaic blocks during creep and that even under relatively high stresses the deformation in the early stages of creep was not uniformly distributed. This conclusion was confirmed by microhardness measurements. The results of statistical analysis of these tests are reproduced in Fig. 1, showing the microhardness (H_y, kg/mm^2) distribution curves for specimens: 1 - before the creep tests; 2 - after 36-h creep at 550 °C (total deformation 0.4%); 3 - after 96-h creep, and 4 - after rapid deformation in creep. Addition of B had a similar effect on the rate of increase in the degree of misalignment of the mosaic blocks, particularly in the steady-creep stage, i.e. when the effect of this addition on the rate of deformation was also most pronounced. Metallographic examination of the surface of Ni-Cr and Ni-B specimens tested in creep showed that both Cr and B slowed down the polygonization and recrystallization processes. The results of the present investigation indicate that Cr and B reduce considerably the rate of dislocation climb in Ni, thus providing

Card 2/3

S/601/62/000/016/004/029
E193/E383

The effect of ....

experimental support for the modern concepts, based on the dislocation theory of the function of alloying elements in alloys with high strength at elevated temperatures.
There are 3 figures and 4 tables.

SUBMITTED: January 26, 1962

Fig. 1:

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KOZYRSKIY, G.Ya.; OKRAINETS, P.N.

Nickel recrystallization during creep. Sbor. nauch. rab. Inst.-
metallofiz. AN URSR no.16:22-30 '62.
(MIRA 16:5)
(Creep of nickel) (Crystallization)

AID Nr. 984-13   6 June

CREEP OF NICKEL (USSR)

Kozyrskiy, G. Ya., and G. A. Petrunin. IN: Akademiya nauk UkrSSR. Institut metallofiziki. Sbornik nauchnykh trudov, no. 16, 1962, 39-43.

The effect of the degree and temperature of prestraining on the creep behavior of 99.99% pure Ni vacuum annealed at 1100°C for 3 hrs has been studied. The effect of the prestrain temperature was studied on specimens prestrained by 6% at 20, 350, 550, or 700°C. Results of creep tests at 550°C under a stress of 6 kg/mm^2 show that with an increase in prestrain temperature from 20 to 350, 550, and 700°C, rupture life decreases from 60 to 52, 21, and 17 hrs, respectively; the duration of second-stage creep decreases from 55 to 50, 19, and 6 hrs, respectively; and the second-stage creep rate increases from 0.04% at 20 and 350°C to 0.23 and 0.5% at 550 and 700°C, respectively. Creep tests (under the same conditions as above) of the specimens pre-strained at a constant temperature of 550°C by 2.5, 2.9, 6, and 13% showed

Card 1/2

AID Nr. 984-13   6 June

CREEP OF NICKEL [Cont'd]   S/601/62/000/016/005/029

that a 2.9% prestrain increased the average rupture life from 20 hrs for an-
nealed specimens to 80 hrs, while a 6% prestrain reduced it to 20 hrs again,
and a 13% prestrain to less than 20 hrs. A similar pattern of creep be-
havior was observed in tests at 700 and 900°C with specimens prestrained
at 20°C. The optimum degree of prestrain found was to be 2.8% for 700°C
and 1.4% for 900°C. Thus, for each temperature there is an optimal degree
of prestraining resulting in the highest heat resistance.   [MS]

Card 2/2

DRYNOV, A.D.; KOZYRSKIY, G.Ya.; OKRAINETS, P.N.

     Vacuum equipment for testing the creep of metals. Sbor. nauch.
rab. Inst.metallofiz. AN URSR no.16:194-197 '62.   (MIRA 16:5)
           (Creep of metals) (Vacuum apparatus)

KOZYRSKIY, G.Ya.

High temperature region of a polygonized structure with positive effect
on its creep. Issl. po zharoproch. splav. 10:8-15 '63.   (MIRA 17:2)

KOZYRSKIY, G.Ya.; PETRUHIN, G.A.

Effect of polygonization and recrystallization on the creep of
nickel. Sbor. nauch. rab. Inst. metallofiz. AN URSR no.17:89-
97 '63.   (MIRA 17:3)

DRINOV, A.D.; KOZYRSKIY, G.Ya.; OKRAINETS, P.N.

High-accuracy contactless temperature regulator. Sbor. nauch. rab.
Inst. metallofiz. AN URSR no.17:193-198 '63.

Method of the control of the creep of high pressure steam pipes
during their use. Ibid.:199-208   (MIRA 17:3)

ACCESSION NR: AT4013920   S/2659/63/010/000/0008/0015

AUTHOR: Kozy*rskiy, G. Ya.

TITLE: The high-temperature region of the positive influence of a polygonized structure on creep

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya po zharoprochny*m splavam, v. 10, 1963, 8-15

TOPIC TAGS: polygonization, creep, high temperature creep, plastic deformation, metallography, roentgenography

ABSTRACT: There are many pure metals which are polygonized during creep at high temperatures. The influence of the substructure on the resistance to creep and on the form of the creep curves was studied in the works of McLean, Oding, Ivanova, and Sherby et al. The present paper discusses an experiment performed to determine the influence of a polygonized structure on creep in 99.99% pure nickel. Round samples with a length of 55 mm for the working piece and a diameter of 5 mm after mechanical finishing) were polished, burnished, and then annealed in a vacuum for 3 hours at 1100C. After annealing, the mean diameter of the grains was 0.4 mm. Tests for creep were carried out in a vacuum at 550,
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ACCESSION NR: AT4013920

700, and 900C, and accordingly matched loads. Creep resistance was determined
as follows: under carefully controlled laboratory conditions, samples were loaded
for a designated period of time, annealed at room temperature, and then investiga-
ted by metallographic and roentgenographic methods. The results of the investi-
gation were as follows: (1) For each temperature there is a certain substructure
and an optimal degree of preliminary deformation producing the most effective in-
crease in heat-resistance. (2) Investigation of the mechanism of plastic
deformation of nickel in the temperature interval 350-900C and at pressures of
0.1-7.5 kg/mm^2 shows that under all conditions the basic role belongs to the dis-
location mechanism of plastic deformation. The contribution of the diffusion
mechanism under these conditions is insignificant. (3) The region of the positive
influence of the polygonized structure on creep at small degrees of deformation
does not have a temperature limit. The exaggeration of the influence of the
diffusive properties of plastic deformation and the insufficient investigation of
the polygonized structure at high temperatures caused this field to be unused
for solving high-temperature problems. Orig. art. has: 4 figures.

ASSOCIATION: Institut metallurgii AN SSSR (Metallurgical Institute AN SSSR)

SUBMITTED: 00   DATE ACQ: 27Feb64   ENCL: 00

SUB CODE: MM   NO REF SOV: 015   OTHER: 013
Card 2/2

ACCESSION NR: AT4010693   S/2601/63/000/017/0089/0097

AUTHOR: Kozy*rskiy, G. Ya.; Petrunin, G. A.

TITLE: The effect of polygonization and recrystallization on the creep of nickel

SOURCE: AN UkrRSR. Insty*tut metalofizy*ky*. Sbornik nauchny*kh trudov, no. 17, 1963. Voprosy* fiziki metallov i metallovedeniya, 89-97

TOPIC TAGS: Creep, polygonization, recrystallization, deformation nickel, nickel creep

ABSTRACT: In some pure metals, among them nickel, creep occurs during polygonization. Roentgengraphic and metallographic investigations of polycrystalline samples of annealed-nickel tested for creep showed that during the process of creep a polygonized structure was formed, as a result of which, resistance to creep increased. The speed of creep and time before disintegration depended on the degree of deformation from the initial poly-gonized structure of the samples. It depended also on the intensity of the process of polygonization and recrystallization taking place during creep. The intensity of these processes was determined to a considerable degree by the temperature and the initial structure. If the metals were strengthened, either as a result of previous deformation

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ACCESSION NR: AT4010693

or during the stage of incomplete creep, then during further creep a return to recrystalli-
zation was observed. If the initial deformation was sufficiently small, then during an-
nealing which followed the deformation, a state of stable polygonization was reached
which prevented recrystallization. In the cases when the initial deformation was suffic-
iently large, recrystallization occurred simultaneous with polygonization. This and
other data were interpreted as follows: the polygonized structure formed during creep
of before the test slowed down the process of creep; the maximally stable state of poly-
gonization was obtained by a previous deformation equal to 2.9%; these samples had the
lowest degree of creep and highest degree of durability. On the basis of investigations
described in the article, the authors reached the following conclusions: (1) The stability
of the initial polygonized structure during creep depends on the degree of previous de-
formation. (2) With an optimal degree of previous deformation the most stable state of
polygonization is obtained. This polygonization has the highest resistance to creep and
recrystallization. (3) Substructures formed as a result of deformations which differ
from the optimal deformation have less resistance to recrystallization and creep.
Orig. art. has: 6 figures and 1 table.

Card   2/3

ACCESSION NR: AT4010693

ASSOCIATION: Insty*tut metalofizy*ky* AN Ukr RSR (Institute of the Metallurgical Physics AN Ukr RSR

SUBMITTED: 00   DATE ACQ: 31Jan64   ENCL: 00

SUB CODE: SS, MM   NO REF SOV: 005   OTHER: 005

Card 3/3

KOZYRSKIY, G. Ya.; OKRAINETS, P.N.

Polygonization in nickel during creep. Sbor. nauch. rab.
Inst. metallofiz. AN URSR no.18:74-82 '64   (MIRA 17:8)

Deformation and structural changes in nickel during an even
application of load. Ibid.:83-89

L 44712-65   EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c)
Pf-4/Pad   1JP(c)   JD/HW

ACCESSION NR: AT5008870   S/2601/64/000/020/0042/0051

AUTHOR: Kozyrskiy, G. Ya.; Okrainets, P. N.; Petrunin, G. A.

TITLE: Characteristics of nickel structures with high creep resistance

SOURCE: AN UkrSSR. Institut metallofiziki. Sbornik nauchnykh trudov, no. 20, 1964.
Voprosy fiziki metallov i metallovedeniya (Problems in the physics of metals and physical
metallurgy), 42-51

TOPIC TAGS: nickel structure, creep resistance, nickel creep, nickel heat treatment,
plastic deformation, strain hardening

ABSTRACT: The aim of this study was twofold: (1) to study the change in the structure
of nickel during creep at 700C from the original state after high-temperature annealing,
and (2) to study the change in structure after a preliminary cold deformation and its
influence on the structural changes in subsequent creep tests, since such data are
necessary for the determination of the nature of structural states which promote an
increase in deformation resistance and in the life of metals during creep. Both sets of
nickel samples were examined by x-ray diffraction in their original state (annealing at
1100C for 3 hrs). The data show that the influence of preliminary cold deformation on

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L 44712-65
ACCESSION NR: AT5008870

the main creep characteristics observed in mechanical creep tests is determined by the difference in the original structural states. Data on the disorientation and fragmentation in the grains indicate that cold plastic deformation is distributed more uniformly in polycrystals than hot deformation, particularly in creep. The optimum substructure is characterized by the greatest possible hardening which does not cause the development of recrystallization in the course of creep tests. The initial substucture of the metal determines the substructure of the steady stage of creep and thus the deformation rate and the duration of this stage. Orig. art. has 9 figures and 1 table.

ASSOCIATION: Institut metallofiziki, AN Ukr SSR (Institute of the Physics of Metals, AN UkrSSR)

SUBMITTED: 25Mar64   ENCL: 00   SUB CODE: MM

NO REF SOV: 009   OTHER: 002

Card 2/2

L 41360-65   EWP(k)/EWP(*)/EWA(c)/EWT(w)/EWP(b)/T/EWA(d)/EWP(t)   Pf-4/Pad   IJP(c
ACCESSION NR: AP4046090   JD/HW   S/0126/64/018/003/0454/0456

AUTHOR: Kozyrskiy, G. Ya.; Larikov, L. N.; Petrunin, G. A.; Shmatko, O. A.

TITLE: The effects of the degree of deformation on polygonization and recrystallization of nickel

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 3, 1964, 454-456

TOPIC TAGS: nickel deformation, polygonization, recrystallization, X ray analysis, metallographic examination

ABSTRACT: An investigation of the effects of deformation on the polygonization and recrystallization of Ni showed that the presence and the location of the point of intersection of the lines describing this relationship are conditional and affected by the choice of the quantitative characteristic of the two processes. Experiments were carried out with 99.99% pure Ni melted in argon. Specimens were compressed at different temperatures to 30-80%, annealed for 8 hrs. and examined by metallographic and X-ray methods. The temperature at which the initial recrystallization nuclei attain 10^{-3} cm within eight hours was chosen as the quan

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L 41360-65
ACCESSION NR: AP4046095

titative characteristic for recrystallization and for polygonization--the tempera-
ture at which interference spots narrow by 25%. In Ni compressed by 80% the in-
itial 10^{-3} cm nuclei appear at 280 C and X-ray interference lines narrow by 20%.
The findings of the authors stand in good agreement with other papers. Orig.
art. has; 3 figures

ASSOCIATION: Institut metallofiziki AN UkrSSR (Institute of Metal Physics, AN
UkrSSR)

SUBMITTED: 15Oct63   ENCL: 00

SUB CODE: MM   NO REF SOV: 007   OTHER: 003

Card 2/2

KOZYRSKIY, G. Ya.; KONONENKO, V.A.

    Vacuum chamber in an IP-4M unit. Zav. lab. 30 no.10:1263-1264
    '64.   (MIRA 18:4)

    1. Institut metallofiziki AN UkrSSR.

L 55975-65   EWT(1)/EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EEC(b)-2/EWP(b)/EWA(c)
P1-4   IJP(c)   JD/Gd
ACCESSION NR: AP5012505   UR/0032/65/031/005/0623/0624
                                                539.16.07

AUTHORS: Kozyrskiy, G. Ya.; Kononenko, V. A.; Sklyarov, O. Ye.

TITLE: An x-ray camera for studying the mosaic structure of crystals

SOURCE: Zavodskaya laboratoriya, v. 31, no. 5, 1965, 623-624

TOPIC TAGS: crystal structure, x-ray photography, metal grain structure / MBS-2
microscope

ABSTRACT: The authors have devised a camera for determining mosaic structure
in crystals. The specimens in this camera may be rotated about any axis perpen-
dicular to the incident beam by having two mutually perpendicular axes of rota-
tion with the direction of the incident beam parallel to one of them. This rota-
tion has caused reflection to disappear in older cameras because of the problem
of beam shape, which is elliptical. This disadvantage is eliminated in the
described setup by keeping the relative position of specimen to beam fixed. An-
other source of error in older cameras, shifting of grains during deformation,
has been removed by developing a special holder for the specimen, allowing com-
pensation for any deformation. The camera permits complete determination of

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L 55975-65
ACCESSION NR: AP5012505

2

mosaic pattern in grains (permits study of grain distribution (about any axis of rotation) caused by creep of metal at high temperature, and also allows observation of other structural changes in metals during deformation. Computations were made by means of an MBS-2 microscope. Orig. art. has: 1 figure.

ASSOCIATION: Institut metallofiziki Akademii nauk UkrSSR (Institute of the Physics of Metals, Academy of Sciences UkrSSR)

SUBMITTED: 00   ENCL: 00   SUB CODE: ES, SS

NO REF SOV: 001   OTHER: 000

Card 2/2

L. 31567-66   EWT(m)/EWP(w)/T/EWP(t)/ETI   IJP(c)   JD/HW/GD/JH

ACC NR: AT6010588   SOURCE CODE: UR/0000/65/000/000/0132/0146

AUTHOR: Kozyrskiy, G. Ya.; Kononenko, V.A.

ORG: Institute of Metal Physics, AN UkrSSR (Institut metallofiziki AN UkrSSR)

TITLE: Effect of aluminum on structural changes in nickel during creep

SOURCE: AN UkrSSR. Fazovyye prevrashcheniya v metallakh i splavakh (Phase transformations in metals and alloys). Kiev, Naukova dumka, 1965, 132-146

TOPIC TAGS: nickel, nickel alloy, aluminum alloy, creep

ABSTRACT: Structural changes occurring during creep of pure nickel and a nickel alloy with 2.93% Al were investigated by subjecting the samples to heat treatment and annealing, then measuring the microhardness, disorientation, and deformation during creep, and using X-ray diffraction analysis. The structure formed during creep was found to be stable during heating without loading up to temperatures higher than the testing temperatures. Addition of 2.93% Al has a substantial effect on the creep of nickel. Deformation during its first stage decreases, and so does the rate of steady-state creep, while the growth of disorientation is hindered. Because it is unevenly distributed over the body of the grains, aluminum does not decrease the inhomogeneity of the distribution of plastic deformation. The inhomogeneous distribution of plastic deformation causes a concentration of stresses in certain parts of the grains (most often in the boundary region). Accumulation of stresses may lead to the

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L 31567-66

ACC NR: AT6010588   0

formation of microcracks. The formation of folds in the body of the grain or grain migration promotes relief of the stresses. The presence of Al hinders the processes of polygonization and recrystallization. A nonuniform distribution of the impurity may cause the formation of a toothlike shape of the grain boundaries. Orig. art. has: 9 figures and 1 table.

SUB CODE: 11   / SUBM DATE: 18Dec64 / ORIG REF: 017 / OTH REF: 008

Card 2/2 LC

L 41747-66   EWT(m)/EWP(w)/T/EWP(t)/ETI   LJP(c)   JD/HW

ACC NR: AP6018041   A   SOURCE CODE: UR/0185/66/011/006/0675/0677

AUTHOR: Kozyrs'kyy, H. Ya.--Kozyrskiy, G. Ya.; Petrunin, H. O.--Petrunin, G. A. 71

ORG: Institute of Metal Physics, AN UkrSSR, Kiev (Instytut metalofizyky AN URSR) 3

TITLE: Effect of the prestressing temperature on the final structure and on the resistance of nickel to creep

SOURCE: Ukrayins'kyy fizychnyy zhurnal, v. 11, no. 6, 1966, 675-677

TOPIC TAGS: nickel, creep, crystal lattice structure, temperature dependence, high temperature strength

ABSTRACT: The purpose of the investigation was to determine the influence of the prestressing temperature on the disorientation of the substructure elements of nickel and to ascertain the effect produced as a result on the behavior of the nickel in creep. Nickel 99.99% pure was tested at 700C and a load of 2.5 kg/mm^2. The samples were prepared and their structure tested with x-rays by a procedure described earlier (G. Ya. Kozyrskiy et al., Issledovaniya po zharoprochnym splavam, v. VI, Izd-vo AN SSSR, 1960, p. 17). The nickel was deformed by tension to different degrees, from 0 to 4%, at temperatures -196, 20, and 300C at a rate of 4 x 10^{-3} sec^{-1}. Before the prestressing the samples were annealed at 1100C for 4 hours and cooled slowly. Mechanical tests have shown that the best endurance to creep was exhibited by samples prestressed at 300C to 3%, or those prestressed at -196 and 20C to 2%. The results are discussed in light of data on the substructure elements produced in the nickel

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L 41747-66

ACC NR: AP6018041

under various conditions of annealing and prestressing, and the effect that the stressing temperature has on the relative angles between the substructure elements. Orig. art. has: 1 figure and 1 table.

SUB CODE: 20/   SUBM DATE: 11Jan66/ ORIG REF: 004/   OTH REF: 001

Card   2/2

L 09013-67   EWT(d)/EWT(m)/EWP(w)/EWP(v)/EWP(t)/ETI/EWP(k)/EWP(h)/EWP(1)___IJP(c)
ACC NR: AP6027792   JD/HW   SOURCE CODE: UR/0126/66/022/001/0108/0111

AUTHOR: Kozyrskiy, G. Ya.; Kononenko, V. A.   45
                                                                           43

ORG: Institute of Metal Physics, AN UkrSSR (Institut metallofiziki AN UkrSSR)

TITLE: Investigation of creep in alloyed nickel subjected to preliminary deformation

SOURCE: Fizika metallov i metallovedeniye, v. 22, no. 1, 1966, 108-111

TOPIC TAGS: tensile testing machine, nickel base alloy, creep mechanism, metal deform-
ation / IP-4M tensile testing machine

ABSTRACT: The article deals with the effect of preliminary deformation performed at room
temperature on the creep of alloyed Ni at 700°C. The investigation was performed on speci-
mens (d = 5 mm, l = 50 mm) of two alloys, representing solid solutions of Ni + 19.8 wt.% Cr
and Ni + 1.18 wt.% Al, annealed at 1100°C until their grain size became 0.4-0.8 mm, which
were stretched at room temperature to various degrees of deformation in an IP-4M machine
at a straining rate of 0.05 mm/sec, after which they were subjected to stabilizing annealing
at 800°C and creep tests at 700°C. The Ni-Cr specimens were tested under a
stress of 10 kg/mm^2 and the Ni-Al specimens, under 2.5 and 5 kg/mm^2. Findings: for Ni-Cr

Card 1/3   UDC: 539.376:546.74:546.797:620.186.4

L 09013-67

ACC NR: AP6027792

/

specimens the optimal degree of deformation was found to be 10% (lowest rate of steady-state
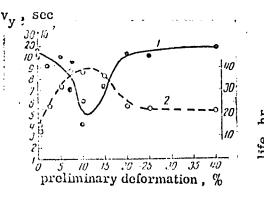creep and longest life) (Fig. 1), whereas for Ni-Al specimens this optimal degree was found

v_y , sec

preliminary deformation , %

Fig. 1. Rate v_y (1) of steady-state creep
and life (2) of the alloy Ni + 19.8
wt.% Cr under a load of 10 kg/mm^2
at 700°C as a function of degree of
preliminary deformation at room
temperature

to be 5%. It is shown that the optimal degree of deformation must be that which, while in-
creasing the creep resistance of the metal, still does not provoke any intense recrystallization
processes. Increasing the load on the Ni-Al specimens from 2.5 to 5 kg/mm^5 eliminates the
positive effect of preliminary deformation. As a metallographic examination showed,
cross slip was absent in the specimens stressed at 2.5 kg/mm^5, whereas it was intense in the

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L 09013-67

ACC NR: AP6027792

specimens stressed at 5 kg/mm^2. This gives reason to believe that the concomitant dis-appearance of the substructural hardening effect is associated with a change in the mechanism of creep on increase in stresses, considering that cross slip makes it possible for screw dis-locations to evade the pile-up barriers. Orig. art. has: 2 figures.

SUB CODE: 11, 20/ SUBM DATE: 06Jan65/ ORIG REF: 010/ OTH REF: 007

Card 3/3   nst

KOZYRSKIY, N.

A modest gift. Prof.-tekh. obr. 12 no.4:33 Ap'55. (MLRA 8:7)

1. Direktor remeslennogo uchilishcha no.22 (g.Nikolayev).
   (Nikolayev--Technical education)

KozyuBERDA, A.F.

USKOV, A.A., geroy Sotsialisticheskogo Truda; DEGTYAREV, V.I.; PO-
POV, V.K.; GRACHEV, L.I.; KHIZHNYACHENKO, P.Ye.; KOZYUBERDA, A.F.;
PISKUNOV, Ye.S., gornyy inzhener; SEDYKH, D.A.; SOROTOKIN, M.S.;
DARCHIYA, L.V.; TANKILEVICH, A., gornyy inzhener.

Soviet miners celebrate Miner's Day with new achievements in pro-
duction. Ugol' 29 no.8:5-20 Ag '54.   (MIRA 7:8)

1. Glavnyy inzhener kombinata Rostovugol' (for Uskov). 2. Uprav-
lyayushchiy trestom Chistyakovantratsit (for Degtyarev). 3. Up-
ravlyayushchiy trestom Vakhrushevugol' (for Popov). 4. Uprav-
lyayushchiy trestom Molotovugol' (for Grachev). 5. Nachal'nik
shakhty "Zapadnaya-Kapital'naya" tresta Nesvetayantratsit (for
Khizhnyachenko). 6. Nachal'nik shakhty No.7 tresta Nesvetayantratsit
(for Kozyuberda). 7. Nachal'nik shakhty no.17-bis tresta Chistya-
kovantratsit (for Piskunov). 8. Nachal'nik shakhty no.1 "TSentral'-
naya" tresta Krasnoarmayskugol' (for Sedykh). 9. Upravlyayushchiy
trestom Prokop'yevskshakhtostroy (for Sorotokin). 10. Nachal'nik
Stroyupravleniya No.2 tresta Tkvarchelshakhtostroy (for Darchiya).
11. Ol'zherasskoye shakhtostroitel'noye upravleniye (for Tankilevich).
     (Coal mines and mining)

KOZHEVIN, V.G.; AFONIN, A.A.; FAT'YANOV, N.M.; SOLLOGUB, V.P.; KOZYUBERDA,
A.F., gornyy inzhener; PRYAKHIN, V.A.; SHINKOVSKIY, A.V.; SUKHACHEV,
D.A.

Let's be ready for the tenth celebration of Miners' Day with new
industrial achievements. Ugol' 32 no.8:4-17 Ag '57.   (MLRA 10:9)

1. Kemerovskiy Sovnarkhoz (for Kozhevin). 2. Glavnyy inzhener tresta
Pervomayskugol' (for Afonin). 3. Glavnyy inzhener tresta Nesvetay-
antratsit (for Fat'yanov). 4. Glavnyy inzhener tresta Kopeyskugol'
(Sollogub). 5. Ayutinskoye shakhtoupravleniye (for Kozyuberda).
6. Shakhta im. Rumyantseva tresta Kalininugol' for Pryakhin). 7. Na-
chal'nik ordena Lenina shakhty No.9 tresta Snezhnyanantratsit (for
Shinkovskiy). 8. Nachal'nik shakhty No.22 "Lomintsevskaya tresta
Shchekinugol' (for Sukhachev).
                    (Coal mines and mining)

NESTEROV, P.P.; SHABANOV-KUSHNARENKO, Yu.P.; KOZYUBERPA, N.I.

New method for determining stresses in wire ropes. Zav.lab. 27
no.2:191-194 '61.   (MIRA 14:3)

1. Khar'kovskiy gornyy institut i Stalingradskiy staleprovolochno-
kanatnyy zavod.
          (Wire rope—Testing)   (Strains and stresses)

KOZYUBERDA, N.I., inzh.

Relation between the twisting of strands and the distribution of
strains in wire cables. Sbor. trud. Inst. gor. dela AN URSR
no.12:135-141 '61.   (MIRA 15:11)
          (Wire rope) (Strains and stresses)

KOZYUBERDA, N.I., inzh.

Determining elastic deformations of a straight, spiral strand
wire rope. Izv. vys. ucheb. zav.; gor. zhur. 7 no.10:124-129
'64.   (MIRA 18:1)

1. Khar'kovskiy institut gornogo mashinostroyeniya, avtomatiki i
vychislitel'noy tekhniki. Rekomendovana kafedroy gornoy mekhaniki.

KOZYUK, S.M., inzhenor (st.Murom)

Using continuous train classification in marshalling yards. Zhel.
dor.transp. 37 no.6:74-75 Je '56.   (MLRA 9:8)
                (Railroads--Making up trains)

KOZYUK, S.M., revizor po bezopasnosti dvizheniya poyezdov (Kiyev)

Safety is our common concern. Put' i put. khoz. 9 no.11:
30-31 '65.   (MIRA 18:11)

SAPRYGINA, YE. S.; KOZYUKINA, N. I.

Wheat

Significance of the place origin of winter wheat varieties. Sel. i sem. 19 No. 9, 1952.

Kozyukov, A.V.

p. 6

PHASE I BOOK EXPLOITATION

SOV/3848

SOV/11-M-97

Moscow. Aviatsionnyy institut imeni Sergo Ordzhonikidze

Prisoyedineniye dopolnitel'noy massy v struynykh apparatakh;
sbornik statey (Mass-Flow Augmentation in Jet Engines;
Collection of Articles) Moscow, Oborongiz, 1958. 238 p.
(Series: Its: Trudy, vyp. 97) Errata slip inserted.
2,210 copies printed.

Ed. (Title page): A.V. Kvasnikov, Professor; Ed. (Inside
book). S.G. Boshenyatov (Deceased); Managing Ed.:
A.S. Zaymovskaya, Engineer; Ed. of Publishing House:
T.A. Valedinskaya; Tech. Ed.: L.A. Lebedeva.

PURPOSE: This collection of articles is intended for scientific
workers at engineering schools and research institutes and also
for engineers working in experimental design offices.

COVERAGE: This collection contains abridged dissertations from
the Department of Aviation Engine Theory, Faculty No. 2, of
the Moskovskiy aviatsionnyy institut (Moscow Aviation Institute)

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Mass-Flow Augmentation in Jet Engines (Cont.)   SOV/3848

during the period from 1946 to 1953. The articles consider various problems arising in augmenting the mass flow in jets and in utilizing the additional mass flow for increasing the thrust of jet engines. References accompany each article. No personalities are mentioned.

TABLE OF CONTENTS:

   This paper is a theoretical study of the mixing process in an ejector used for mass-flow augmentation in a jet engine. The theory considers the initial phase of the mixing process for the case where the basic flow is subsonic. Fundamental equations are derived which characterize the mixing process in the entrance section of

Card 2/ 12

the mixing chamber and permit the calculation of the length
and the profile of the mixing-chamber wall, as well as the
effect of the ejection coefficient and the turbulence factor
on the mixing. It was found that the length of the initial
sections of the mixing chamber depends primarily on the
ejection coefficient μ and the magnitude of the test con-
stant α which characterize the structure of the turbulent
flow of the driving gas. The length of the mixing chamber
is essentially independent of the difference in the velocities
and temperature of the flows. The profile of the wall of
the entrance section is extremely close to a straight line,
slightly inclined with respect to the ejector axis. This
angle of inclination depends primarily on μ, α, the velo-
city ratio u_2/u_1, and the temperature ratio T_2/T_1. The
compressibility of the basic flow has a negligible effect
on the mixing process up to sonic velocity. The analytical
results are supported by experiments with an air ejector.
As an incidental result of the study it was shown that, for
a mass flow of the basic jet equal to 0.5 kg/sec and a pres-
sure ratio of 1.85, an increase in thrust equal to 25-35
percent of the thrust of the basic jet could be obtained.

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Mass-Flow Augmentation in Jet Engines (Cont.)   SOV/3848

Mikhalev, S.V., Candidate of Technical Sciences. Investigation
of the Flow in a Two-Dimensional Nozzle With an Ejector   43
    1. Aerodynamic model of an ejector   44
    2. Plane-parallel ejector (general case)   47
    3. Plane-parallel ejector with rectilinear walls   51
    4. Reactive thrust of a plane-parallel nozzle with an
        ejector   59
    5. Calculation data   69
    6. Conclusions   85
    This paper presents a theoretical investigation of the
parameters of a gas flow at the entrance and exit of a
nozzle-ejector shroud, including the velocity fields
inside and outside the shroud, the pressure distribu-
tion at the walls of the shroud, and the thrust of the
nozzle and shroud combination. The derivation of the
fundamental equations makes use of the methods of inter-
nal aerodynamics of an incompressible fluid in combina-
tion with potential flows around bodies. The method
consists of summing up two elementary flows, the flow
in the field of a system of vortices whose distribution
is governed by the geometry of the shroud, and the flow
of a turbulent submerged jet. It is shown that it is
possible to find velocity fields of a two-dimensional
turbulent flow inside an ejector shroud with a given

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Mass-Flow Augmentation in Jet Engines (Cont.)   SOV/3848

geometry of the walls without taking into consideration
dissipation forces (viscosity and thermoconductivity).
Comparison of the analytical results with experimental
data shows that the properties of the complex flow ob-
tained by the aforementioned theoretical treatment coin-
cide with the properties of the actual flow observed in
the ejector; that is, the character of turbulent mixing
in an ejector is the same as in a free turbulent submer-
ged jet. The flow in an ejector may thus be regarded as
a flow of a submerged jet which is deformed due to the
presence of the engine walls whose effect may be theore-
tically identified with the effect of a system of point
vortices where the turbulent-viscosity coefficient is
assumed constant in determining the vortex intensity.
The actual velocity fields inside and outside the engine
differ from the ideal, particularly near the walls, be-
cause of the presence of the boundary layer. Corrections
for the effect of the boundary layer are given which
permit determination of the actual velocities inside the
engine. The thrust determined from the analytical equa-
tions was found to be in good agreement with experimental

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Mass-Flow Augmentation in Jet Engines (Cont.) SOV/3848

data. A number of sample calculations are presented.

Kozyukov, A.V., Candidate of Technical Sciences. Thrust
Increase in a Compound Jet Nozzle With Constant Flow
This paper presents the results of an experimental study
of the relationship between thrust and the geometric para-
meters of nozzles and ejector shrouds. It was found that
the thrust increment due to the addition of atmospheric
air to the basic jet depends on the ratio of the diameter
of the cylindrical part of the shroud and the nozzle and,
as shown by the tests, may reach 70 - 85 percent for con-
stant flow. The ejection coefficient μ was found to be
directly proportional to the diameter of the cylindrical
part of the shroud. With large increases of the mass-flow
augmentation ratio, a considerably larger increase in
thrust was obtained than in the case of small ratios (60-
80 percent instead of 20-35 percent). Large thrust increases
obtained in the experiments suggest the possibility of
using the ejector shroud on jet engines at low flight
speeds, for example during take-off.

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SOV/88-58-97-4/7

AUTHOR: Kozyukov, A. V., Candidate of Technical Sciences

TITLE: Increasing the Thrust of a Continuous Flow Composite Jet
                Nozzle (Ob uvelichenii tyagi v sostavnom reaktivnom sople
                postoyannogo potoka)

PERIDICAL: Trudy Moskovskogo aviatsionnogo instituta, 1958, Nr 97:
                Addition of a Supplementary Volume in Jet Apparatus
                (Prisoyedineniye dopolnitel'noy massy v struynykh apparatakh),
                pp 87-97 (USSR)

ABSTRACT: This article presents some generalized experimental research
                data on constant-flow ejector nozzles with large coefficients
                of air mass addition. The author demonstrates that with very
                large increase of the air mass addition coefficient it is
                possible to obtain a much larger increase of thrust than in
                the case of relatively small coefficients (60-80 percent for
                large, and 20-35 percent for small coefficients. The author
                arrives at the following conclusions: 1) The increase of
                thrust due to addition of atmospheric air to the primary jet
                of a stationary nozzle depends on the ratio of diameters of
                the nozzle and of the augmenter. Experiments show that with

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Increasing the Thrust of a Continuous Flow Composite Jet Nozzle

constant flow this increase may attain 70-85 percent. 2) The value of the
ejection coefficient is directly proportional to the diameter of the
cyllindrical sector of the augmenter. 3) Large increases of thrust (up to
85 percent) obtained in tests show the possibility of the use of augmenters
for jet engines in slow flight (takeoff assistance, for instance). Biblio-
graphy consists of 3 references, all of them Soviet.

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26. 2321

AUTHORS: Fradkina, E. M. and Kozyukov, A. V.

TITLE: Turbulent flow in a conductive liquid under the effect of
             electrodynamic forces

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 3, 1961, 283-285

TEXT: The authors studied the flow of a concentrated blue vitriol solution
under the effect of an ampère force in a device designated as "Gomopolyarnik".
M. F. Shirokov and Ye. P. Vaulin made a generalization of the semi-empiri-
cal theory of turbulent flow in cylindrical Karmán-Nusselt tubes to the
turbulent flow of an incompressible liquid in the Gomopolyarnik. A con-
centrated solution of blue vitriol (density 1.1) was filled into a copper
vessel with coaxial cylindrical walls which served as electrodes. The
radii of the cathode and the anode were r_k = 4.3 and r_a = 7.3 cm,
respectively; the height of the liquid was h = 16 cm. This liquid was
contained in an electromagnet which produced a sufficiently homogeneous
axial magnetic field (290 to 1730 oersteds). The velocity of the liquid
which was caused to rotate by the ampère force in the crossed electric

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Turbulent flow in a conductive...

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and magnetic fields was measured by means of a Pitot tube connected with a micromanometer. During this measurement also the viscosity of the liquid was changed as a result of its strong heating. For this reason also the temperature dependence of the viscosity of the liquid concerned was studied by means of a Pinkevich-Mitrofanova micrometer. The results of these measurements are illustrated in Fig. 1. The Reynold's number was 6000 to 60000 in the experiments. The following expression holds for the theoretical curves:

$$\log v = \frac{4}{7} \log I + \frac{4}{7} \log H - \frac{4}{7} \log\left(\frac{0.330\rho^{3/4}S_k\eta^{1/4}}{2d^{5/4}}\right) \quad (2) \text{ where } I = J_k; H$$

denotes the magnetic field strength, d - the width of the tube, R - Reynold's number, A a constant depending on the ratio of the radii r_1 and r_2 of the cylinder walls which contained also the universal constant a = 0.1493. For a turbulent flow the experimental and the theoretical results agree to within at least 6 %. These results differ, however, from those obtained for the theoretical curves described by

$$\log v = \log i + \log H + \log B \quad (3) \text{ with}$$

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$$B = \cfrac{r\left(1-\dfrac{r_k^2}{r^2}\right)\cfrac{\ln\dfrac{r_a}{r_k}}{1-\dfrac{r_k^2}{r_a^2}} - \ln\dfrac{r}{r_k}}{4\pi ch\eta}$$

This could be expected since Eq. (3) was obtained by taking the logarithm of the equation

$$v = \frac{IH}{4\pi ch\eta}\left[r\left(\lambda - \frac{r_k^2}{r^2}\right)\frac{\ln\dfrac{r_a}{r_k}}{1-\dfrac{r_k^2}{r_a^2}} - \ln\frac{r}{r_k}\right]$$

by G. A. Gordeyev and A. M. Gubanov (ZhTF, XXVIII, 2046, 1958) for the velocity of a laminar flow v at a point which is at a distance r from the axis of the device. There are 3 figures and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: W. R. Baker a. S. A. Colgate. Second United Nations International Conference on the Peaceful Uses of Atomic Energy, 18 July, 1958.

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z7652

3/535/61/000/132/008/012
E030/E484

11.0100

AUTHOR: Kozyukov, A.V., Candidate of Technical Sciences

TITLE: Thermal conductivity of gasoline B-70 (B-70),
              kerosene T-1 and fuel T-5 in the liquid phase

SOURCE: Moscow. Aviatsionnyy institut. Trudy. no.132.1961.94-108.
              Teplofizicheskiye svoystva nekotorykh aviatsionnykh
              topliv v zhidkom i gazoobraznom sostoyanii.

TEXT: A heated wire apparatus was used.   It was calculated that
to keep the product of the Grashof and Prandtl numbers (the
"Rayleigh" number) below 1000 to eliminate free convection under a
temperature difference of 10°C, the tube diameter had to be less
than 1 mm.   The glass tubes chosen therefore had internal
diameters of 0.8 to 0.9 mm, measured to be uniform to at least
0.01 mm.   The platinum heater wires had diameters of 0.1 mm and,
by mounting them with a special jig containing two perpendicular
microscopes on an optical bench to ensure alignment, the maximum
error due to eccentric mounting of the heater was 0.05%.   The end
heat corrections were calculated and were only 0.5%.   The glass
tubes were annealed for 5 hours at 450°C.   Measurements were
carried out from -50 to +300°C.   Over this region, the thermal
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Thermal conductivity of gasoline ... E030/E484

conductivities were fairly linear in temperature, and smoothed
data are given in Table 3.   Experiments carried out at pressures
from 1 atm to 20 atm showed that the thermal conductivity
increased by 0.5% at lower temperatures and 1% at higher
temperatures.   The accuracy of the measurements is ± 1.5%.
M.A.Mikheyev is mentioned in the paper.   There are 10 figures,
4 tables and 4 Soviet references.

Table 3.

Substance	Temperature in °C							
	—50	0	50	100	150	200	250	300
Бензин Б-70 Gasoline	0,113	0,1035	0,0950	0,0864	0,079	0,0688	—	—
Керосин Т-1 Kerosene	0,109	0,1025	0,0958	0,0896	0,0830	0,0766	0,0702	0,0635
Топливо Т-5 Fuel	0,106	0,102	0,0968	0,922	0,0878	0,0824	—	—

Card 2/2

ACC NR: AR6036305   SOURCE CODE: UR/0273/66/000/009/0004/0004

AUTHOR: Gusyatnikov, V. A.; Kozyukov, V. A.

TITLE: Investigation of torsional vibrations of the transmission shaft on a reduced model

SOURCE: Ref. zh. Dvigateli vnutrennogo sgoraniya, Abs. 9.39.22

REF SOURCE: Tr. Chelyab. in-ta mekhaniz. i elektrifik. s. kh., vyp. 24, 1965, 49-53

TOPIC TAGS: torsional vibration, internal combustion engine, electric generator, shear stress

ABSTRACT: The described investigation was carried out on a shaft connecting the DET-250 diesel-electric tractor with an electric-transmission generator. The torsional system consisted of an internal combustion engine, shaft, and electric generator is a multiple-mass one. Such a system can be replaced with a simpler two-mass system by combining a number of cited masses. A diagram of this system is given. A model study of the resonance effect has shown that the

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ACC NR: AR6036305

torsional system of the diesel, transmission shaft, and generator has a zone of resonance revolutions in the range of 200—300 rpm at starting. The shear stresses arising in this case exceed the calculated ones at the rated moment by 10—11 times. [Translation of abstract]   [NT]

SUB CODE: 21/

Card 2/2

KOTGANOV, V.I., inzn.; VIGANOV, S.I., inzh.

Recording two or more parameters of mercury using a single oscillator. Trakt. i sel'khozmash. no.12-23:41   D '58.

1. Chelyabinskiy traktornyy zavod.

ACC NR: AP6035676   (A,N)   SOURCE CODE: UR/0413/66/000/019/0025/0025

INVENTOR: Baskakov, Yu. A.; Mel'nikov, N. N.'; Kozyukov, V. P.; Stonov, L. D.; Sergeyeva, T. A.

ORG: none

TITLE: Preparation of orthochlorophenyl esters of N-isopropyl- and N-sec.-butylcarbamic acids. Class 12, No. 186434 [announced by All-Union Scientific Research Institute of Chemicals for Plant Protection (Vsesoyuznyy nauchno-issledovatel'skiy institut khimicheskikh sredstv zashchity rasteniy)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 19, 1966, 25

TOPIC TAGS: orthochlorophenyl isopropylcarbomate, orthochlorophenyl butylcarbamate, isopropyl formate, herbicide, ester, carbamic acid, wheat

ABSTRACT: In the proposed method, o-chlorophenyl N-isopropylcarbamate and o-chlorophenyl N-sec.-butylcarbamate are obtained by the reaction of o-chlorophenyl formate with isopropyl- and sec.-butylamine in water with an excess of the amine or in the presence of an equimolar amount

Card 1/2   UDC: 547.562.07

ACC NR: AP6035676

of an alkali or an organic base. These esters are used as herbicides
to combat Avena fatua in wheat before or after the wheat seedlings
appear.   [W.A. 50]

SUB CODE: 07,06/SUBM DATE: 17Oct63

Card 2/2

KOZYULEV, G.I., inzh.; SHUYEV, S.I., inzh.

Utilization of the heat of scavenging water. Prom. energ. 18
no.11:6-7 N '63.   (MIRA 16:12)

KOZYULIN, A. S.

91-58-7-4/27

AUTHOR: Zul', N. M., Plyugachev, V. K., Candidates of Technical Sciences,
            Isayenko, A.V., Kozyulin, A.S., Kurtsvayl', G.I., Bernshteyn, L.Kh.,
            Yeganov, B.N., Engineers

TITLE: The Protection of Branches of 6 to 10 kv Lines (O zashchite otpayek
            ot liniy 6-10 kv).

ABSTRACT: The editor prints the comments on articles dealing with the above
            problem published by P. V. Ternikov in "Energetik", Nr 4, 1956
            and by M. Yu. Shukhatovich in "Energetik", Nr. 6, 1957.
            N. M. Zul', Candidate of Technical Sciences says that most of the
            6 to 10 kv rural distributing networks with radial long distance
            branched lines are protected only at the terminal switch. To
            increase the reliability of the electric power supply, it is
            recommended to tap the lines widely utilizing safety fuses. Com-
            bining main line safety fuses with those of branch lines, as
            well as with automatic reclosing systems is very advisable. This
            method is described in detail. The following devices can be
            utilized: "UGP-51" or PG-10" types for automatic reclosing; "IT-81"
            type relay, direct release relays and safety fuses of "PSN" or "PK"
            type. Experimental samples of reclosing safety fuses have been

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The Protection of Branches of 6 to 10 kv Lines   91-58-7-4/27

worked out and manufactured at "VET" and "VIESKh" on the
basis of "PK" type fuses, and the 10 kv line switch of pole
type with simple instantaneous and automatic load reclosing
of single-phase model with nominal currents of 5 to 20 amp.
and breaking capacity of 5 mega volt-amperes has been worked
out by the "Uralelektroapparat" plant. V. K. Plyugachev,
Candidate of Technical Sciences and A. V. Isayenko, Engineer,
examine lines with dead branches. The automatic reclosing
system cannot be utilized in this case. The exact solution
can be obtained only by determining the failure-rate of
lines and other elements of electric power supply. The average
failure-rates of certain elements of networks are contained in
a table and the method of determining the breakdown loss of
electric energy on lines with automatic reclosing system and
branches without safety fuses is described in detail.
A. S. Kozyulin, Engineer, indicates that in a network rayon
containing lines of a few hundred kilometers length, over
a 5 year period, 80% of the failures were caused by short-
circuits to the earth. Inter-phase short-circuits were
caused mainly by a fall of line supports.
G. I. Kurtsvayl', Engineer, says that most branched town
distributing networks of 6 to 10 kv have a radial power

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supply, and that subscriber's branch lines can be connected with main lines only by disconnectors. Such lines are located with 2 to 3.5 megawatts and their total length attains 3 to 5 km. They are connected with 25 to 35 transformers, which are protected only at the switch of line terminal section coming from the bars of the rayon substation. Such lines are to be connected with subscribers by means of "PK" type safety fuses and power disconnectors (load switches) of "VN-16" type in closed rooms of "PT" type or by means of "PSN-10" type safety fuses in outdoor installations.

L.Kh. Bernsteyn, Engineer, writes that long distance branched networks of 6 to 10 kv with radial power supply can be protected by safety fuses, but the latter must be combined with disconnectors for subdividing main lines. However, the design of pole safety fuses described by P.V. Ternikov is not to be recommended.

B.N.Yeganov, Engineer, writes that the protection of branched 6 to 10 kv main lines can be carried out in many variants utilized according to the total length of the main line. There are 2 figure, 1 graph, 2 tables and 3 Soviet references.

Card 3/3

1. Transmission lines--Overload protection   2. Fuses (Electricity)
--Equipment   3. Electric switches--Equipment

SAFRONOV, V.I., tekhnik; ZIMEL'S, L.Sh., inzh.; KOZYULIN, A.S., inzh.;
KULESHOV, Ya.T., inzh.

Discussion of F.S. Popov's article "Construction of 6 to 10 kv
mast substations" and A.A. Priakhin's article "Is it proper to
transfer the line cutout of a 10 kv mast substation to the end
pole of an electric power transmission line?" Energetik 8
no. 10:22-24 O '60.   (MIRA 14:1)
      (Electric lines--Overhead)   (Electric substations)
                  (Popov, F.S.)   (Priakhin, A.A.)

KOZYULIN, V. V.

"Composition Techniques in Architecture of the Last
Half of the Eighteenth and the Beginning of the Nineteenth Century.
(A Study of Farm Estate Complexes in the Left-Bank Ukraine)." Academy
of Architecture Ukrainian SSR, Inst of Postgraduate Studies, Kiev, 1955.
(Dissertation for the Degree of Candidate in Architectural Sciences)

SO: M-955, 16 Feb 56

KOZYULIN, V., arkhitektor

Partition units. Zhil. stroi. no.8:19-21 '59.

(Walls) (Built-in furniture)

(MIRA 12:12)

KLYKOV, Yevgeniy Vladimirovich; KOZYULINA, Raida Ivanovna; BRAYLOVSKIY,
N.G., inzh., red.; VASIL'YEVA, N.N., tekhn. red.

[Automatic regulators of freight car brake systems (condi-
tional No.265-002 and conditional No.265-003)]Avtomaticheskie
reguliatory gruzovykh rezhimov tormozheniia (usl. No.265-002
i usl. No.265-003). Moskva, Transzheldorizdat, 1962. 38 p.
(MIRA 15:9)

(Railroads--Freight cars--Brakes)

POLKANOV, L.D.; ZHIGLEVICH, S.V., kand. tekhn. nauk, dots.,
       otv. red.; KHRYAPCHENKOV, A.S., kand. tekhn. nauk,
       dots., otv. red.; KOZIULINA, N.M., red.

       [Marine gas turbine installations; manual] Sudovye gazo-
       turbinnye ustanovki; uchebnoe posobie. Gor'kii. Pt.2.
       [Turbocompressors, heat exchangers, combustion chambers]
       Turbokompressory, Teploobmenniki, Kamery sgoraniia. 1963.
       155 p.   (MIRA 17:9)

       1. Gorki. Politekhnicheskiy institut.

AKIMENKO, A.D.; RUKAVISHNIKOV, L.G.; SKVORTSOV, A.A., doktor tekhn.
nauk, otv. red.; KOZYULINA, R.M., red.

[Temperature measurements; laboratory work on the course
"Control and automation of technological processes"] Iz-
merenie temperatur; laboratornyi praktikum po kursu
"Kontrol' i avtomatizatsiia tekhnologicheskikh protsessov."
Gor'kii, Gor'kovskii politekhn. in-t, 1963.   67 p.
(MIRA 17:3)

YAKOVLEV, M.S., inzh., starshiy prepodavatel'; MATTES, N.V., doktor
tekhn.nauk, prof. otv.red.; KOZYULINA, R.M., red.

[Methods for determining the ability of river vessels to pass
through ice] Metodika opredeleniia ledoprokhodimosti rechnykh sudov.
Gor'kii, 1961. 23 p. (Gorkiy. Politekhnicheskii institut. Trudy,
vol. 17, no.1).   (MIRA 16:3)

1. Gor'kovskiy politekhnicheskiy institut imeni A.A.Zhdanova,
kafedra sudostroyeniya (for Yakovlev).
          (Inland navigation) (Ice-breaking vessels)

KARPOV, A.B.; YAK____V. M.S., inzh., otv. red.; KOZYULINA, R.M., red.

[Some problems in buoyancy and stability calculations; textbook for students of the Faculty of Shipbuilding] Nekotorye voprosy raschetov plavuchesti i ostoichivosti; uchebnoe posobie dlia studentov korablestroitel'nogo fakul'teta. Gor'kii, Gor'kovskii politekhn. in-t, 1961. 122 p.

(MIRA 18:4)

ABRAMOV, V.V., doktor tekhn. nauk, prof.; VERKHOVSKIY, A.V., doktor
       tekhn. nauk, otv. red.; KOZYULINA, R.M., red.

       [Using the dissection method for calculating beams having
       extensive curvatures]Raschet brus'ev bol'shoi krivizny me-
       todom raschleneniia tela; uchebnoe posobie. Gor'kii, 1962.
       22 p.   (MIRA 16:1)
       1. Gorki. Politekhnicheskiy institut. Kafedra soprotivle-
       niya materialov.
                      (Beams and girders)

MOLODOVSKIY, V.A., kand. tekhn. nauk; AGAFONOVA, A.L.;
        GRANENOVA, V.P.; KOZYULINA, R.M., red.

    [Laboratory work in physical chemistry] Praktikum po
    fizicheskoi khimii. Gor'kii. No.3-4. 1963.
                                    (MIRA 17:7)
    1. Gorkiy. Politekhnicheskiy institut.

KOZYULYA, I.

KOZYULYA, I.

First results of reorganizing the construction administration
in Moscow Province. Gor.i sel.stroi. no.8/9:1-4 Ag-S '57.
(MIRA 10:12)

1. Nachal'nik Glavmosoblstroya.
            (Moscow Province--Construction industry)

KOZYULYA, Ye. (Minsk)

Department store of the tractor plant workers in Minsk.
Sov. torg. 36 no.8:50-51 Ag '63.   (MIRA 16:11)

BIRYUKOV, L.T.; KOZYULYA, Yu.N.

    Automatic machine for the welding of spades. Avtom. svar. 14 no.3:
    88-94 Mr '61.   (MIRA 14:2)

    1. Artemovskiy mashinostroitel'nyy zavod "Pobeda truda."
          (Spades)   (Electric welding)

Kozyura, A.S.

SOV/32-25-7-42/50

AUTHORS: Mikhaylov, L. A., Komissarov, P. I.; Miroshnikov, V. A.; Gruss, Ya. E., Kagan, M. Ye., Vayl', Ye. I., Kozyura, A. S.; Shlyarov, A. I.

TITLE: News in Brief (Korotkiye soobshcheniya)

PERIODICAL: Zavodskaya laboratoriya, 1959, Vol 25, Nr 7, pp 896-897 (USSR)

ABSTRACT: L. A. Mikhaylov, P. I. Komissarov, V. A. Miroshnikov (workers in a Plant Laboratory) describe a device (Fig.) for sampling weld wires. The sampling was carried out by means of a spur gear cutter; about 70 g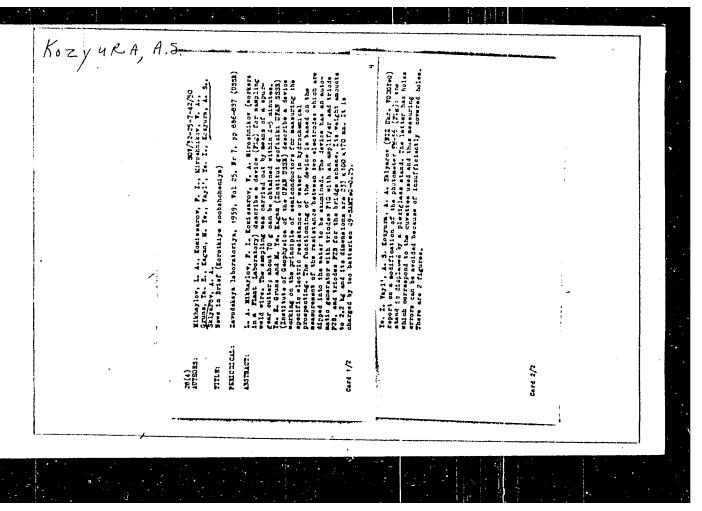 can be obtained within 2-3 minutes. Ya. E. Gruss and M. Ye. Kagan (Institut geofiziki UFAN SSSR) (Institute of Geophysics of the UFAN SSSR) describe a device working on the principle of semiconductors for measuring the specific electric resistance of water in hydrochemical prospecting. The functioning of the device is based on the measurement of the resistance between two electrodes which are dipped into the water to be examined. The device has an automatic generator with triodes P1G with an amplifier and triode P2B, and triodes P2B for the bridge scheme. Its weight amounts to 2.2 kg and its dimensions are 35 x100 x170 mm. It is charged by two batteries -9-SMT-0-0.25).

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Ye. I. Vayl', A. S. Kozyura, A. A. Shlyarov (NII UKr-, VODKEo) report on a modification of the photometer FM-56 (Fig.): the stand is displaced by a plexiglass stand. The latter has holes which correspond to the cuvettes used and thus measuring errors can be avoided because of insufficiently covered holes. There are 2 figures.

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KOZYURA, A.S.

SHCHEGOLEV, Konstantin Vladimirovich, kand.tekhn.nauk; KOZYURA, Anatoliy
Sergeyevich; KHAYLOVICH, Yuriy Aleksandrovich. Prinimala
uchastiye BOLTINA, M.V.; KOMENDANT, K., red.; BABIL'CHANOVA, O.,
tekhn.red.

[Chemical purification of industrial waste waters] Khimicheskaia
ochistka promyshlennykh stochnykh vod. Kiev, Gos.izd-vo lit-ry
po stroit. i arkhit.USSR, 1961. 91 p.   (MIRA 14:4)

1. Moscow. Vsesoyuznyy nauchno-issledovatel'skiy institut vodo-
snabzheniya, kanalizatsii, gidrotekhnicheskikh sooruzheniy i
inzhenernoy gidrologii. Ukrainskoye otdeleniye.
            (Sewage--Purification)